SN74LS240, SN74LS244

Octal Buffer/Line Driver with 3-State Outputs

The SN74LS240 and SN74LS244 are Octal Buffers and Line Drivers designed to be employed as memory address drivers, clock drivers and bus-oriented transmitters/receivers which provide improved PC board density.

- Hysteresis at Inputs to Improve Noise Margins
- 3-State Outputs Drive Bus Lines or Buffer Memory Address Registers
- Input Clamp Diodes Limit High-Speed Termination Effects

GUARANTEED OPERATING RANGES

Symbol	Parameter	Min	Typ	Max	Unit
V_{CC}	Supply Voltage	4.75	5.0	5.25	V
T_A	Operating Ambient Temperature Range	0	25	70	°C
I_{OH}	Output Current – High			–3.0	mA
				–15	mA
I_{OL}	Output Current – Low			24	mA

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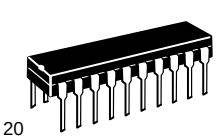
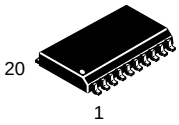
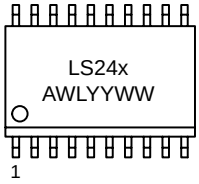
LOW POWER SCHOTTKY

MARKING DIAGRAMS



PDIP–20
N SUFFIX
CASE 738





SOIC–20
DW SUFFIX
CASE 751D

x = 0 or 4
A = Assembly Location
WL = Wafer Lot
YY = Year
WW = Work Week

ORDERING INFORMATION

Device	Package	Shipping
SN74LS240N	PDIP–20	1440 Units/Box
SN74LS240DW	SOIC–20	2500/Tape & Reel
SN74LS244N	PDIP–20	1440 Units/Box
SN74LS244DW	SOIC–20	2500/Tape & Reel

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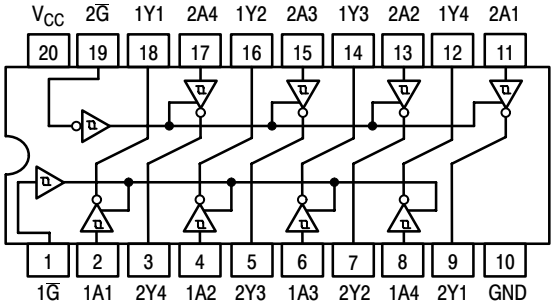
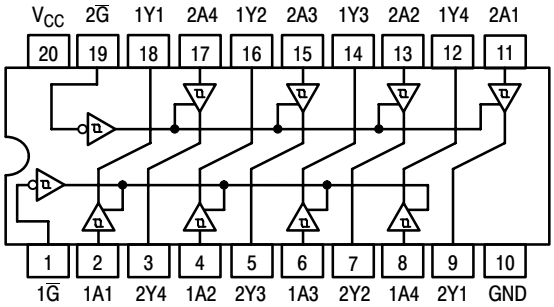
LOGIC AND CONNECTION DIAGRAMS DIP (TOP VIEW)

SN74LS240



SN74LS244



TRUTH TABLES

SN74LS240

INPUTS		OUTPUT
1$\overline{G}$, 2$\overline{G}$	D	
L	L	H
L	H	L
H	X	(Z)

SN74LS244

INPUTS		OUTPUT
1$\overline{G}$, 2$\overline{G}$	D	
L	L	L
L	H	H
H	X	(Z)

H = HIGH Voltage Level
L = LOW Voltage Level
X = Immaterial
Z = HIGH Impedance

DC CHARACTERISTICS OVER OPERATING TEMPERATURE RANGE (unless otherwise specified)

Symbol	Parameter		Limits Min	Typ	Max	Unit	Test Conditions	
V_{IH}	Input HIGH Voltage		2.0			V	Guaranteed Input HIGH Voltage for All Inputs	
V_{IL}	Input LOW Voltage				0.8	V	Guaranteed Input LOW Voltage for All Inputs	
$V_{T+}–V_{T–}$	Hysteresis		0.2	0.4		V	V_{CC} = MIN	
V_{IK}	Input Clamp Diode Voltage			–0.65	–1.5	V	V_{CC} = MIN, I_{IN} = –18 mA	
V_{OH}	Output HIGH Voltage		2.4	3.4		V	V_{CC} = MIN, I_{OH} = –3.0 mA	
			2.0			V	V_{CC} = MIN, I_{OH} = MAX	
V_{OL}	Output LOW Voltage			0.25	0.4	V	I_{OL} = 12 mA	V_{CC} = V_{CC} MIN, V_{IN} = V_{IL} or V_{IH} per Truth Table
				0.35	0.5	V	I_{OL} = 24 mA	
I_{OZH}	Output Off Current HIGH				20	μA	V_{CC} = MAX, V_{OUT} = 2.7 V	
I_{OZL}	Output Off Current LOW				–20	μA	V_{CC} = MAX, V_{OUT} = 0.4 V	
I_{IH}	Input HIGH Current				20	μA	V_{CC} = MAX, V_{IN} = 2.7 V	
					0.1	mA	V_{CC} = MAX, V_{IN} = 7.0 V	
I_{IL}	Input LOW Current				–0.2	mA	V_{CC} = MAX, V_{IN} = 0.4 V	
I_{OS}	Output Short Circuit Current (Note 1.)		–40		–225	mA	V_{CC} = MAX	
I_{CC}	Power Supply Current Total, Output HIGH				27	mA	V_{CC} = MAX	
	Total, Output LOW	LS240			44			
		LS244			46			
	Total at HIGH Z	LS240			50			
		LS244			54			

1. Not more than one output should be shorted at a time, nor for more than 1 second.

AC CHARACTERISTICS (T_A = 25°C, V_{CC} = 5.0 V)

Symbol	Parameter	Limits Min	Typ	Max	Unit	Test Conditions
t_{PLH} t_{PHL}	Propagation Delay, Data to Output LS240		9.0 12	14 18	ns	C_L = 45 pF, R_L = 667 Ω
t_{PLH} t_{PHL}	Propagation Delay, Data to Output LS244		12 12	18 18	ns	
t_{PZH}	Output Enable Time to HIGH Level		15	23	ns	
t_{PZL}	Output Enable Time to LOW Level		20	30	ns	
t_{PLZ}	Output Disable Time from LOW Level		15	25	ns	C_L = 5.0 pF, R_L = 667 Ω
t_{PHZ}	Output Disable Time from HIGH Level		10	18	ns	

AC WAVEFORMS

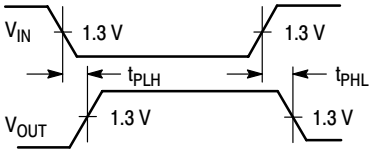


Figure 1.

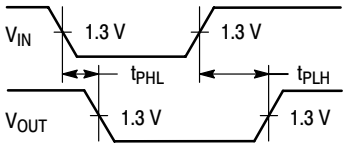


Figure 2.

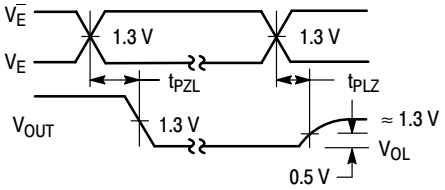


Figure 3.

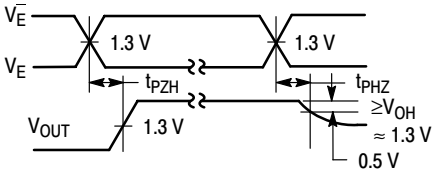
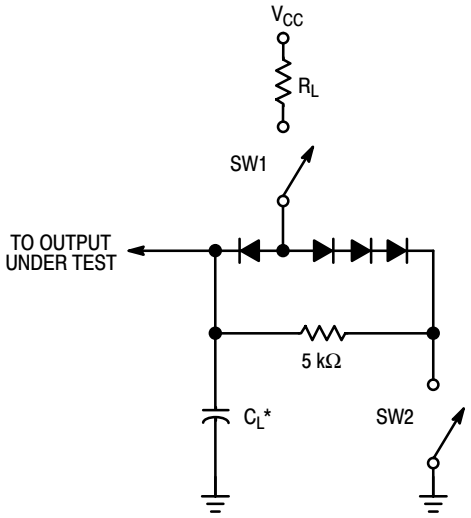


Figure 4.



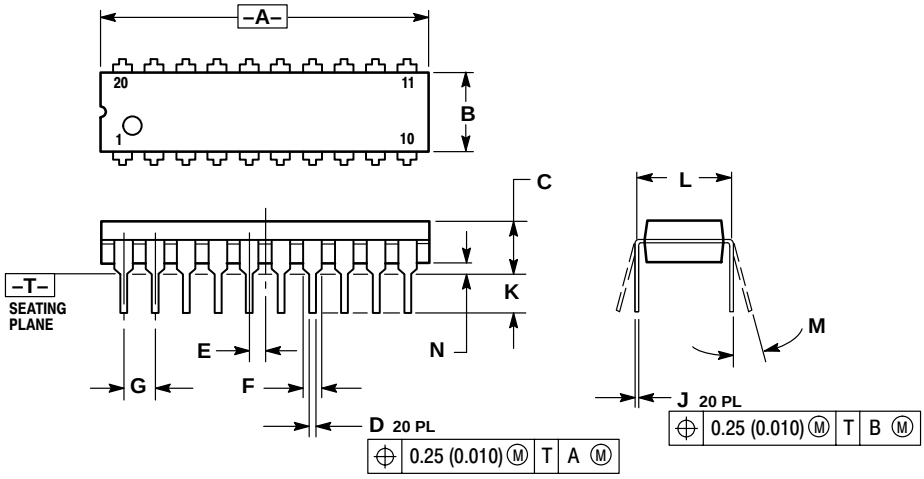
SWITCH POSITIONS

SYMBOL	SW1	SW2
t_{PZH}	Open	Closed
t_{PZL}	Closed	Open
t_{PLZ}	Closed	Closed
t_{PHZ}	Closed	Closed

Figure 5.

PACKAGE DIMENSIONS

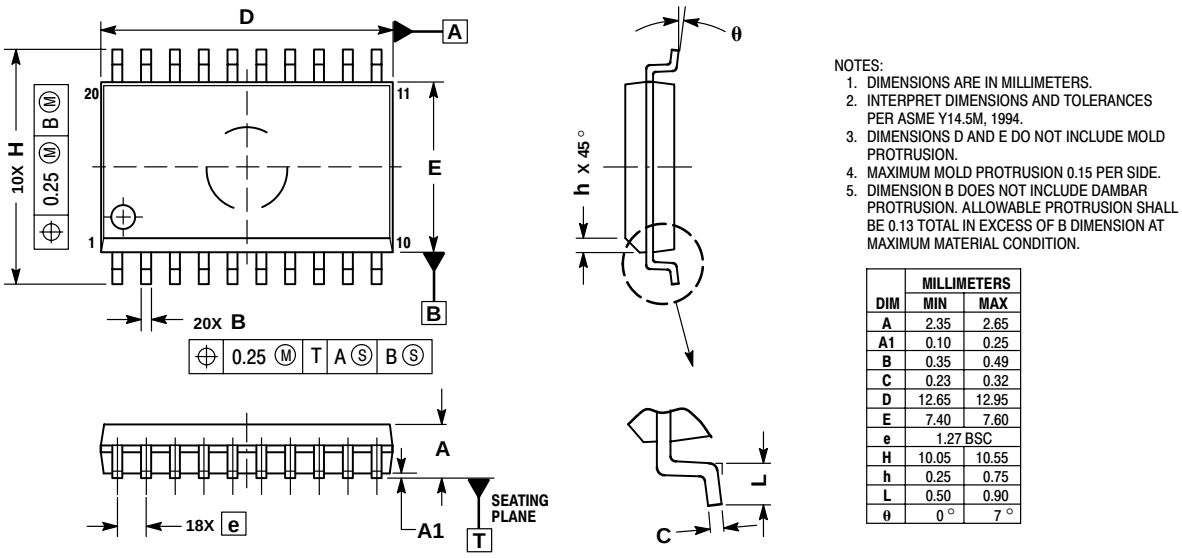
N SUFFIX
PLASTIC PACKAGE
CASE 738–03
ISSUE E



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION L TO CENTER OF LEAD WHEN FORMED PARALLEL.
4. DIMENSION B DOES NOT INCLUDE MOLD FLASH.

	INCHES		MILLIMETERS	
DIM	MIN	MAX	MIN	MAX
A	1.010	1.070	25.66	27.17
B	0.240	0.260	6.10	6.60
C	0.150	0.180	3.81	4.57
D	0.015	0.022	0.39	0.55
E	0.050 BSC		1.27 BSC	
F	0.050	0.070	1.27	1.77
G	0.100 BSC		2.54 BSC	
J	0.008	0.015	0.21	0.38
K	0.110	0.140	2.80	3.55
L	0.300 BSC		7.62 BSC	
M	0°	15°	0°	15°
N	0.020	0.040	0.51	1.01

D SUFFIX
PLASTIC SOIC PACKAGE
CASE 751D–05
ISSUE F



NOTES:
1. DIMENSIONS ARE IN MILLIMETERS.
2. INTERPRET DIMENSIONS AND TOLERANCES PER ASME Y14.5M, 1994.
3. DIMENSIONS D AND E DO NOT INCLUDE MOLD PROTRUSION.
4. MAXIMUM MOLD PROTRUSION 0.15 PER SIDE.
5. DIMENSION B DOES NOT INCLUDE DAMBAR PROTRUSION. ALLOWABLE PROTRUSION SHALL BE 0.13 TOTAL IN EXCESS OF B DIMENSION AT MAXIMUM MATERIAL CONDITION.

	MILLIMETERS	
DIM	MIN	MAX
A	2.35	2.65
A1	0.10	0.25
B	0.35	0.49
C	0.23	0.32
D	12.65	12.95
E	7.40	7.60
e	1.27 BSC	
H	10.05	10.55
h	0.25	0.75
L	0.50	0.90
θ	0°	7°

Notes

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